Contractor:

SMART VISION CO.

Document Title:

Testing and commissioning Procedure

Client:

Bank Albilad

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1. Scope of Work

This Testing & Commissioning Procedure covers the requirements for the initial Energizing of the system and will encompass inspection, testing and commissioning.

2. Reference Documents

Document Name	Document Number
IFC Drawings	
Single Line Diagram	

3. Pre-commissioning checklist and test

Prior to commissioning, the smart vision must perform the pre-commissioning checks. This activity shall be conducted by the competent persons as stated at the end of the checklist, whilst adhering to the relevant laws and regulations. A copy of the completed pre-commissioning checklist and test results must be submitted to Client, and client representative.

During the pre-commissioning checks, the system shall not be engaged to the grid. The pre commissioning checks consist of the following:

1- Information about Project
2- Checklist for General Inspection
3- Checklist for PV Module Mounting Structure & Civil foundation.
4- Checklist for DC Junction Box or String Monitoring Box
5- Checklist for Earthing & Lightning Arrestor
6- Checklist for PV Module
7- Checklist for Inverter
8- Checklist for AC Distribution Box
9- Checklist of Cable identification and cable routing inspection
10- Checklist for weather monitoring station and monitoring system
11- Cable insulation test
12- String fuse continuity and string open circuit voltage test
13- String DC short circuit current test
14- Isolation device functional test

4. Testing and commissioning checklist

This activity shall be conducted by competent persons as stated at the end of the checklist whilst adhering to the provisions of all relevant laws and regulations.

After completion of the pre-commissioning checklist and tests, the smart vision must perform commissioning tests to ensure all inter-connections of the components are satisfactory.

The commissioning test comprises the following:

1- Information about PV module
2- Information about PV array
3- Information about inverter
4- Inverter functional test
5- Acceptance test

5. Annexes:

5.1. Pre-Commissioning Checklist

			PV Module Handover Check List					
Project Name:_____					location:_____			
Date:_____					Operating period:_____			
No.	Check Description						Status	Comments
1	PV modules are physically installed as per plans (number and layout) (Review wiring diagram)							

2	Wiring (termination) is neat and secure		
3	There are no damaged or misaligned modules in the array		
4	All Code and PSS required labels are on the combiner cover		
5	The PV module model number matches the plans		
6	PV modules are in good condition (no broken glass or cells, no discoloration, frames not damaged)		
7	There is no potential for wire damage (e.g., deburred metal and proper sheathing to protect wires)		
8	Check the grounding impedance of each loop of the substructure Visual inspection of ground connections		
9	Confirm metallic PV module frame grounding uses a dedicated grounding conductor		
10	Check the cable holders condition (fixings, connections, galvanization)		
11	Check the cables position at the electric panel input (humidity risk)		
12	Visually check if there is an unexpected shading caused by growing plants or others		
13	Visually check the frame condition (anchorage, corrosion, module fixing and fastenings)		
14	Check the module connections and the electric cables DC and their		
15	Review tightening using torque wrench according to manufacturer recommendations		
16	Dissimilar metals are electrically isolated to avoid galvanic corrosion		
17	Check that the nameplate of the PV modules		
18	Check that all PV Modules in all rows are spaced equally from each other top to bottom		
19	Check that all PV Modules in all rows are spaced equally from each other top to bottom		

20	Check that the cables are fixed properly to the structure without any damage to the cables		
21	Check all PV module clamps torque is within the allowed range with reference to the supplier Installation Manual		

Testing

No.	Test Description	Status	Measured data	Comments
1	Short-circuit current, Isc			
2	Open-circuit voltage, Voc			
3	Check hotspot heating on the modules by IR thermography			
4	Measuring IV Characteristics of a Solar Cells			
5	infrared camera test			
6	Ambient temperature test			
7	DC Polarity			
8	Insulation and continuity checks			
9	LV cable insulation & continuity tests			

A: Accepted -- B: Accpted With Comment -- C:Reject--D:Hold

No.	Name:	Position:	Date:	Signature
1				

2									
3									
4									

5.2. Model PV Array Test Report

Model PV Array Test Report							
Installation address:							
				Date:			
Description of work under test:				Inspector:			
				Test Instruments:			
String	String reference	1	2	3	4		*n*
	Module						
	Quantity						
Array parameters (as specified)	*V*oc (stc)						
	*I*sc (stc)						
String overcurrent protective device	Type						
	Rating (A)						
	DC rating (V)						
	Capacity (kA)						
String Wiring	Type						
	Phase (mm2)						
	Earth (mm2)						
String test	*V*oc (V)						
	*I*sc (A)						
	Irradiance						
Polarity check							
Array insulation resistance	Test voltage (V)						
	Pos – Earth (MΩ)						
	Neg – Earth (MΩ)						

Earth continuity (where fitted)							
Array isolator	Rating (A)						
	Rating (V)						
	Location						
	Functional check						
Inverter	Make and model						
	Serial number						
	Functioning OK						

Comments: